Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

420
31
2/

June 1956 ARS-33-21

U.S. DEPARTMENT OF AGRICULTURE
AUG 27 1956
BELTSVILLE

United States Department of Agriculture
Agricultural Research Service

SCREENING TESTS WITH SOME N-SUBSTITUTED ACETAMIDES FOR SYNERGISTIC ACTION IN ALLETHRIN FLY SPRAYS

By
S. I. Gertler, P. G. Piquett, and W. A. Gersdorff
Entomology Research Branch

Several groups of compounds have been examined at the Beltsville, Md., laboratory in an effort to find new synergists for pyrethrins and allethrin.[1/] In the present study a group of N-substituted acetamides were tested for possible synergism with allethrin. The physical constants of these compounds are given in ARS-33-14.

The compounds were incorporated in sprays alone and in mixtures with 25 mg. of allethrin per deciliter of solvent. Since some of the compounds were only slightly soluble in deodorized kerosene, the solvent generally used in fly sprays, acetone was used as an auxiliary solvent. Compounds alone were at a concentration of 1000 mg. per deciliter of 1:1 acetone-kerosene. The mixtures were at a concentration of 25 mg. of allethrin plus 250 mg. of adjunct per deciliter of 1:3 acetone-kerosene.

Allethrin standards were prepared in the two solvent mixtures at 25 and 50 mg. per deciliter for the tests with the adjuncts, and at 25, 50, 100, and 200 mg. per deciliter for the tests with mixtures. The allethrin used was from a distilled sample of high purity (94 percent by the hydrogenolysis method).

The tests were made by the Campbell turntable method on laboratory-reared adult house flies (Musca domestica L.). Approximately 100 flies averaging 2-3 days in age were used in each test. The mixed sprays were replicated four times on the same day with the same population of flies. The sprays containing the adjuncts alone were replicated twice. Since it was necessary to make the tests in several series, each with a different population of flies, the allethrin standard sprays were included in each series.

Since knockdown of flies is increased by acetone, it is not reported. For the sprays containing allethrin knockdown would be complete, or nearly so, at the concentrations used without the presence of acetone.

1/ For reports on other groups of compounds tested for similar synergistic action see E-805, 828, 837, 848, 869, ARS-33-9, and ARS-33-18.

The adjuncts alone caused no or negligible mortality in 1 day at the concentrations used. The mean mortalities obtained with the other sprays are given in table 1.

It is apparent from these results that the mixtures caused no appreciable increase in mortality over that expected from allethrin alone. Previous work with the same procedure has shown that with the same number of tests in a series a mortality approaching that caused by the standard at 50 mg. per deciliter will be required to demonstrate synergism. Since this requirement was not met, a statistical analysis was not necessary to show the abence of synergistic effect.

These acetamides, then, are unpromising as synergists with allethrin in fly sprays.

Table 1.--Joint toxic action against house flies of certain N-substituted acetamides and allethrin. Concentration of allethrin in mixture, 25 mg. per deciliter. Four replicates unless otherwise stated.

Series	Compound	Percent mortality				
		Mixture	Allethrin at indicated milligrams per deciliter			
			25	50	100	200
1	Acetamide, N-methyl-	5	6[1/]	45	75	93
	N-ethyl-	9				
	N-propyl-	5				
	N-isopropyl-	5				
	N-butyl-	4				
2	Acetamide, N-sec-butyl-	7	12	44	63	92
	N-tert-butyl-	14				
	N-pentyl-	4				
	N-methylbutyl-	5				
	N-hexyl-	5				
3	Acetamide, N,N-dimethyl-	1	5	34	79	87
	N,N-diethyl-	5				
	N,N-diisopropyl-	8				
	N,N-dibutyl-	7				
	N,N-dipentyl-	7				
4	Acetamide, N-dioctyl-	5	7	32	60	75
	N,N-di-2-ethylhexyl-	13				
	N-(2-hydroxyethyl)-	8				
	N-(3-methoxypropyl)-	6				
	N-(2-hydroxyethylaminoethyl)-	5				
5	Acetamide, N-benzyl-	6	8	35	75	91
	N-(alpha-methylbenzyl)-	5				
	N-phenethyl-	5				
	N-(3-dimethylaminopropyl)-	3				
	N-(3-isopropoxypropyl)-	5				
6	Acetamide, N,N-dibenzyl-	14	11	51	76	92
	N-cyclohexyl-	12				
	N,N-dicyclohexyl-	10				
	N-(2-bicyclohexyl)-	12				
	Piperidine, 1-acetyl-	15				

Table 1.--Continued

Series	Compound	Percent mortality				
		Mixture	Allethrin at indicated milligrams per deciliter			
			25	50	100	200
7	Acetamide, N,N'-propylenebis-	8	15	42	62	83
	N-methyl-	4				
	Acetanilide, N-ethyl-	9				
	N-isopropyl-	11				
	Morpholine, 4-acetyl-	8				
8	Acetanilide, N-butyl-	5	10	38	80	92
	N-pentyl-	8				
	N-isopentyl-	5				
	2'-hydroxy-	4				
	Acetamide, N,N'-p-phenylenebis-	5				
	Benzoic acid, 2-acetamide-5-chloro-	3				
9	Acetanilide, 3'-hydroxy-	9	19	57	83	94
	4'-hydroxy-	6				
	3'-acetyl-	5				
	4'-(1,1-dimethylpropyl)-	12				
	3-Picoline, 2-acetamino-	11				
10	Acetanilide, 2',5'-dichloro-	3	12	41	81	94
	2',5'-dichlorobis-	4				
	2',5'-diethoxy-	4				
	2',5'-dimethoxy-	5				
	2'-phenyl-	7				
11	Acetanilide, 4'-benzoyl-	4	6	66[1/]	93[1/]	97[1/]
	3'-nitro-	1				
	2',4'-dinitro-	5				
	o-Acetotoluidide, 5'-chloro-	14				
12	Acetanilide, 4'-dimethylamino-	16	27	55[1/]	79[1/]	--
	2'-chloro-4'-nitro-	12				
	o-Acetanisidide, 5'-chloro-	18				

1/ Average of 2 replicates.

U. S. DEPT. OF AGR. LIBRARY
BELTSVILLE BR.
LIBRARIAN
10-24-55 PLANT INDUSTRY STA.
33 BELTSVILLE, MD.